CHAPTER 2

DESCRIPTION OF THE PIGEON RIVER WATERSHED

2.1. BACKGROUND. The Pigeon River of Western North Carolina and East Tennessee rises above Canton, North Carolina, the site of a large Champion Paper Co. paper mill, formerly the source of considerable pollution to the river. Below this, it flows roughly parallel to Interstate 40 for many miles, and is impounded by a dam belonging to Duke Energy (Waterville) before entering Tennessee, where it flows into the French Broad River well above Douglas Dam and the resultant reservoir.

This Chapter describes the location and characteristics of the Tennessee Portion of the Pigeon River Watershed.

2.2. DESCRIPTION OF THE WATERSHED.

2.2.A. General Location. The Tennessee Portion of the Pigeon River Watershed is located in East Tennessee and includes parts of Cocke, Jefferson, and Sevier Counties.

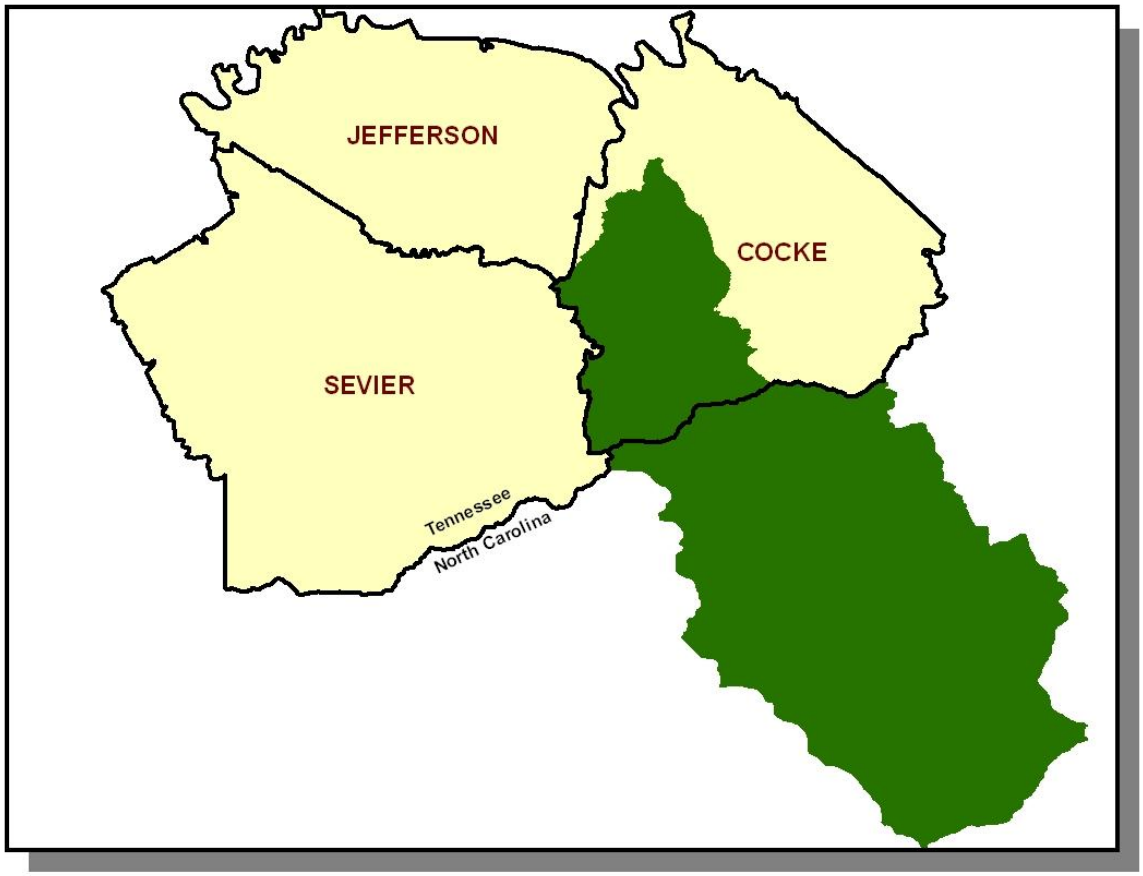

Figure 2-1. General Location of the Pigeon River Watershed.

COUNTY	% OF WATERSHED IN EACH COUNTY
Cocke	99.42
Sevier	0.50

Table 2-1. The Tennessee Portion of the Pigeon River Watershed Includes Parts of Two East Tennessee Counties.

2.2.B. Population Density Centers. One interstate and five highways serve the major communities in the Tennessee portion of the Pigeon River Watershed.

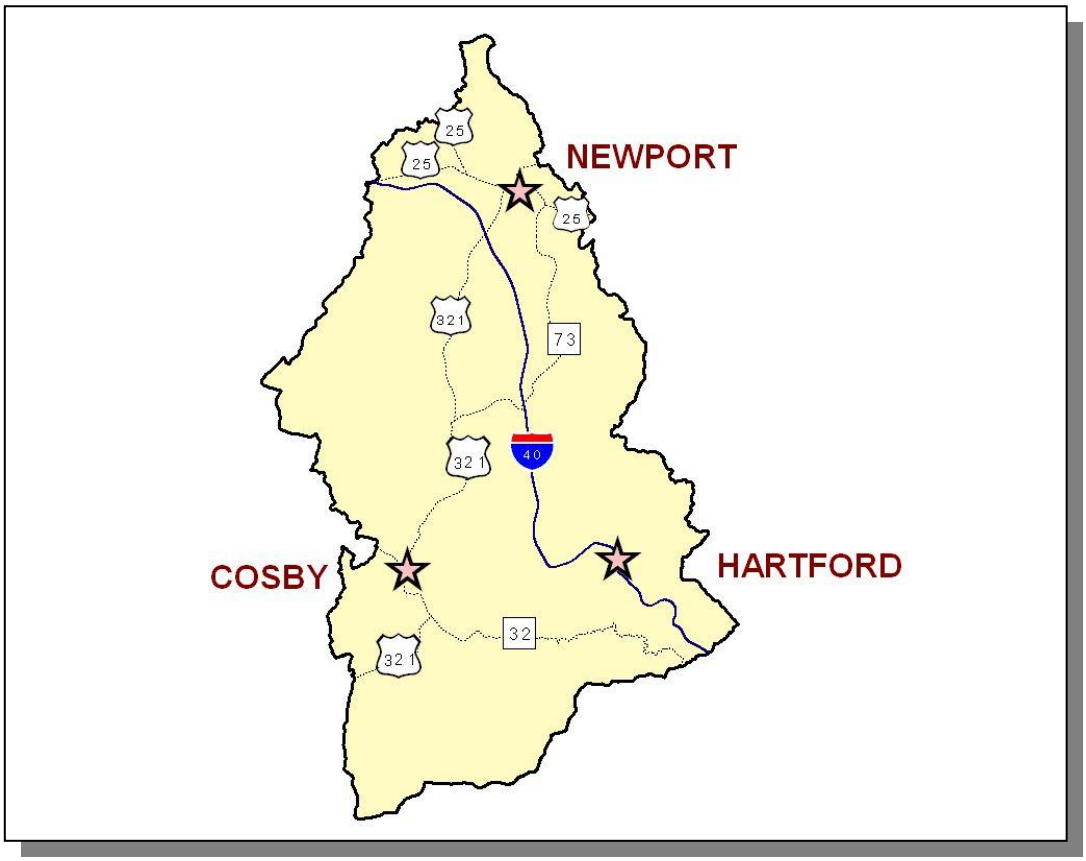

Figure 2-2. Communities and Roads in the Tennessee Portion of the Pigeon River Watershed.

MUNICIPALITY	POPULATION	COUNTY
Newport*	7,242	Cocke
Cosby	5,464	Cocke
Hartford	814	Cocke

Table 2-2. Municipalities in the Tennessee Portion of the Pigeon River Watershed. *Population based on 2000 census (Tennessee Blue Book) or http://www.hometownlocator.com. Asterisk (*) indicates county seat.*

2.3. GENERAL HYDROLOGIC DESCRIPTION.

2.3.A. Hydrology. The Tennessee Portion of the Pigeon River Watershed, designated 06010106 by the USGS, is approximately 704 square miles (153 square miles in Tennessee) and drains to the Pigeon River.

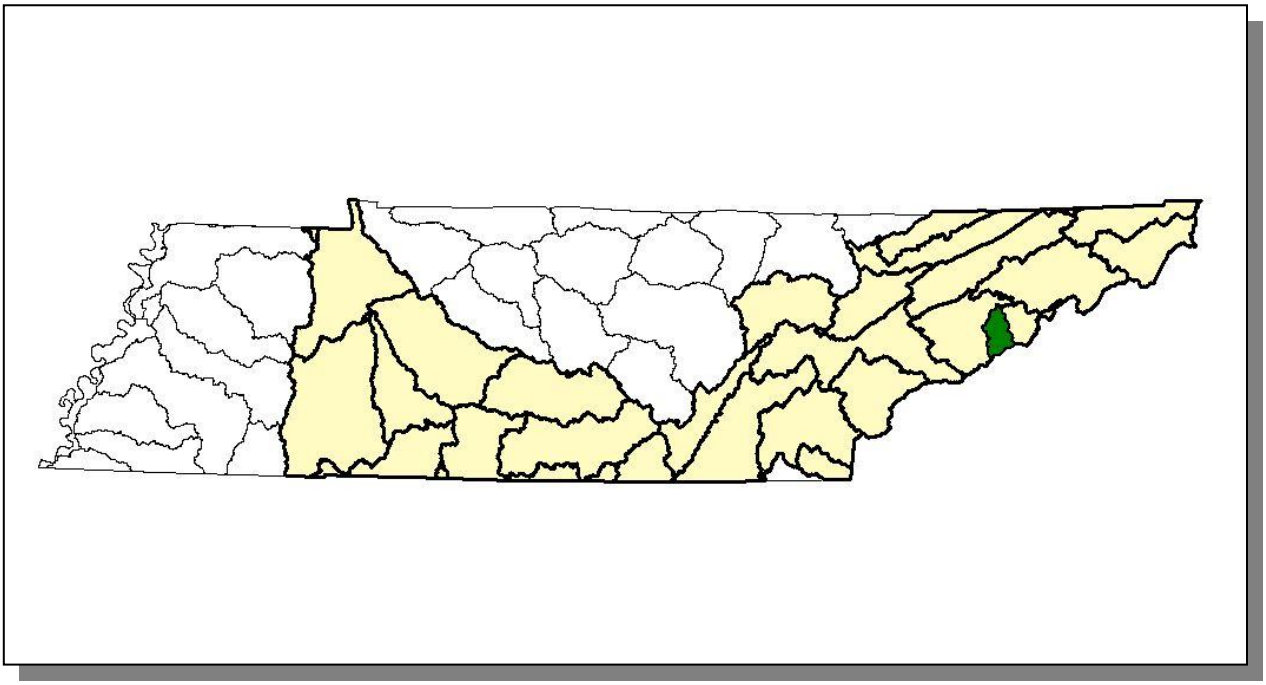

Figure 2-3. The Tennessee Portion of the Pigeon River Watershed is Part of the Tennessee River Basin.

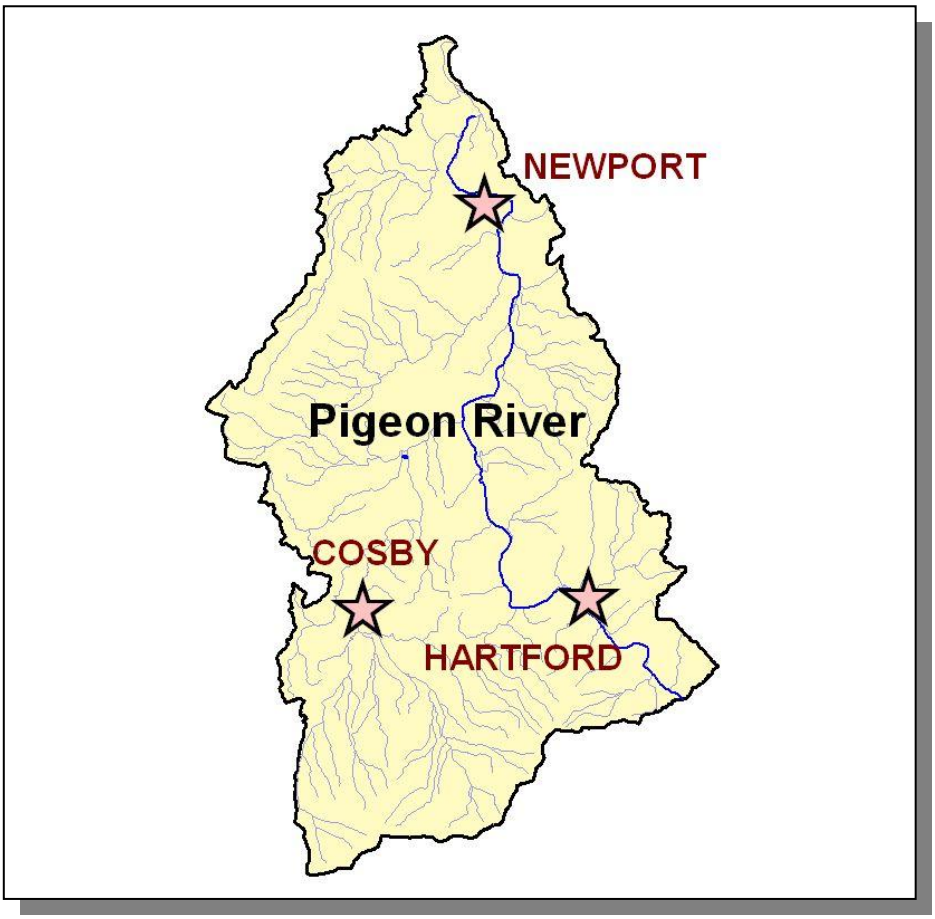

Figure 2-4. Hydrology in the Pigeon River Watershed. *There are 310.8 stream miles recorded in River Reach File 3 in the Tennessee Portion of the Pigeon River Watershed. Location of the Pigeon River and the cities of Cosby, Hartford, and Newport are shown for reference.*

2.3.B. Dams. There is one dam inventoried by TDEC Division of Water Supply in the Tennessee portion of the Pigeon River Watershed. This dam either retains 30 acre-feet of water or has a structure at least 20 feet high.

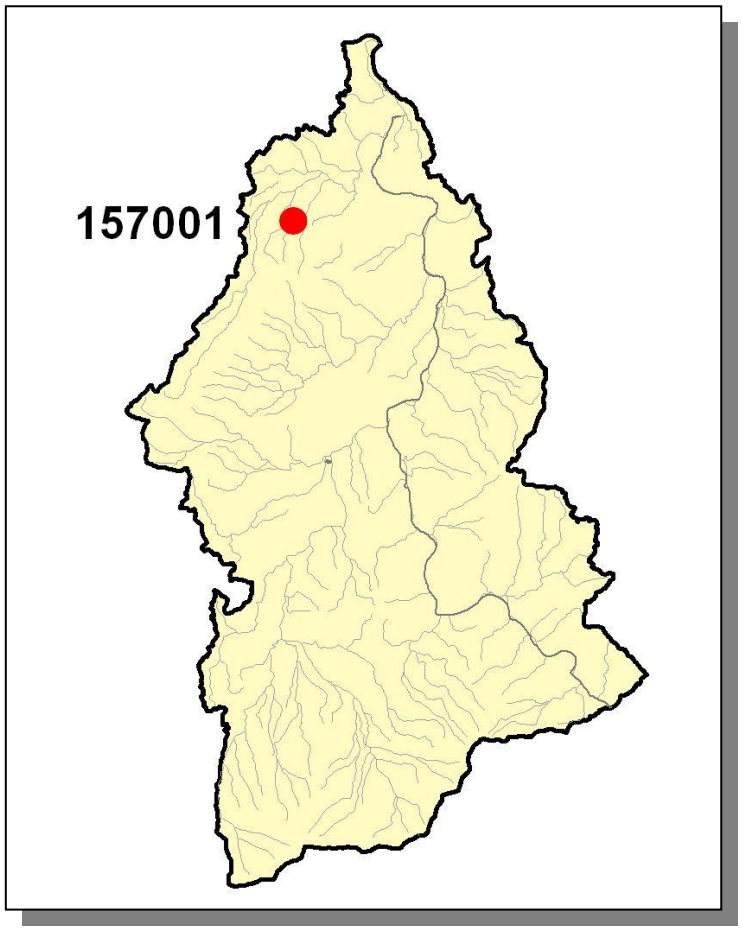

Figure 2-5. Location of Inventoried Dams in the Tennessee Portion of the Pigeon River Watershed. *More information, including identification of inventoried dams labeled, is provided in Appendix II and at http://gwidc.memphis.edu/website/dams/viewer.htm.*

2.4. LAND USE. Land Use/Land Cover information was provided by EPA Region 4 and was interpreted from 2001 Multi-Resolution Land Cover (MRLC) satellite imagery.

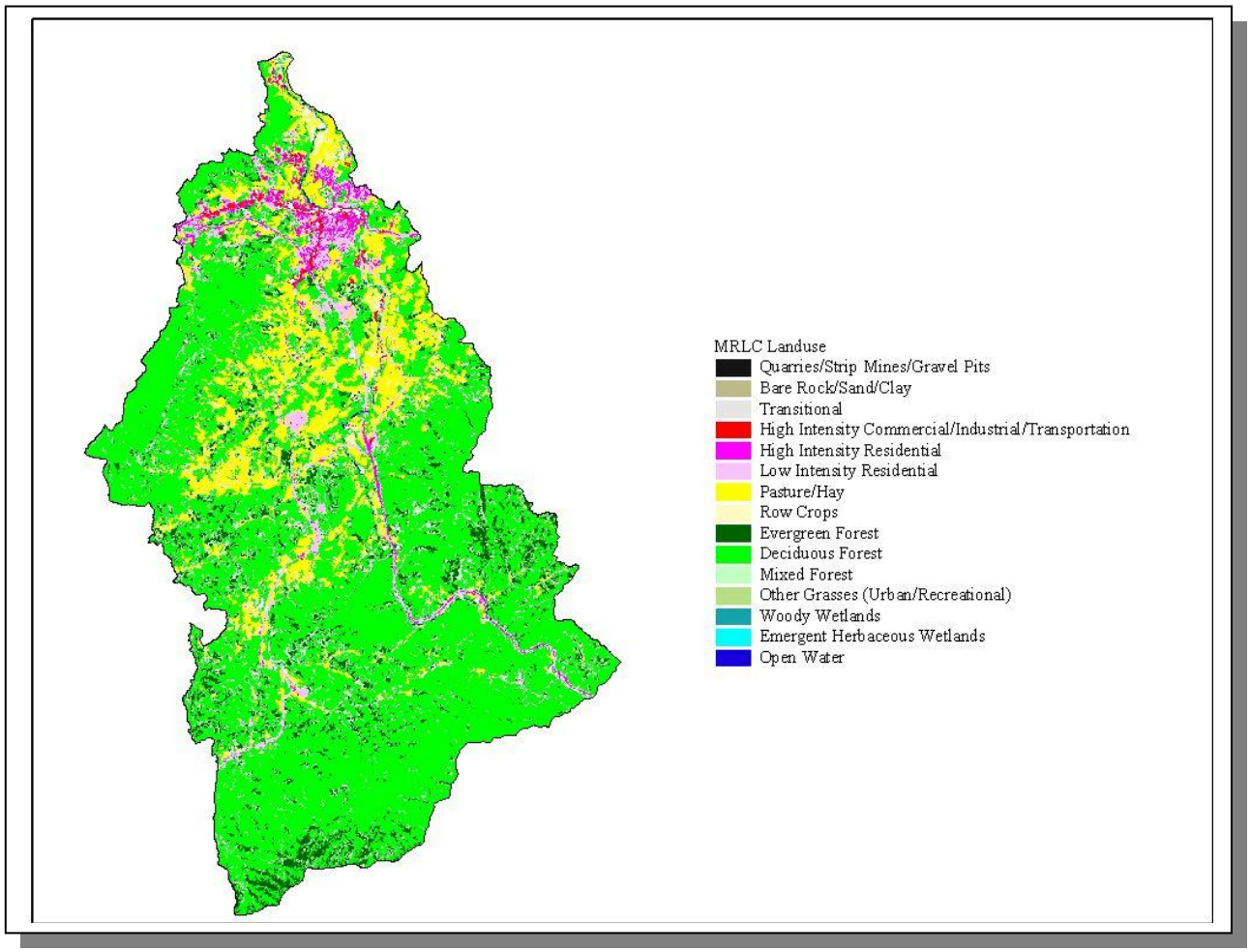

Figure 2-6. Illustration of Select Land Cover/Land Use Data from MRLC Satellite Imagery.

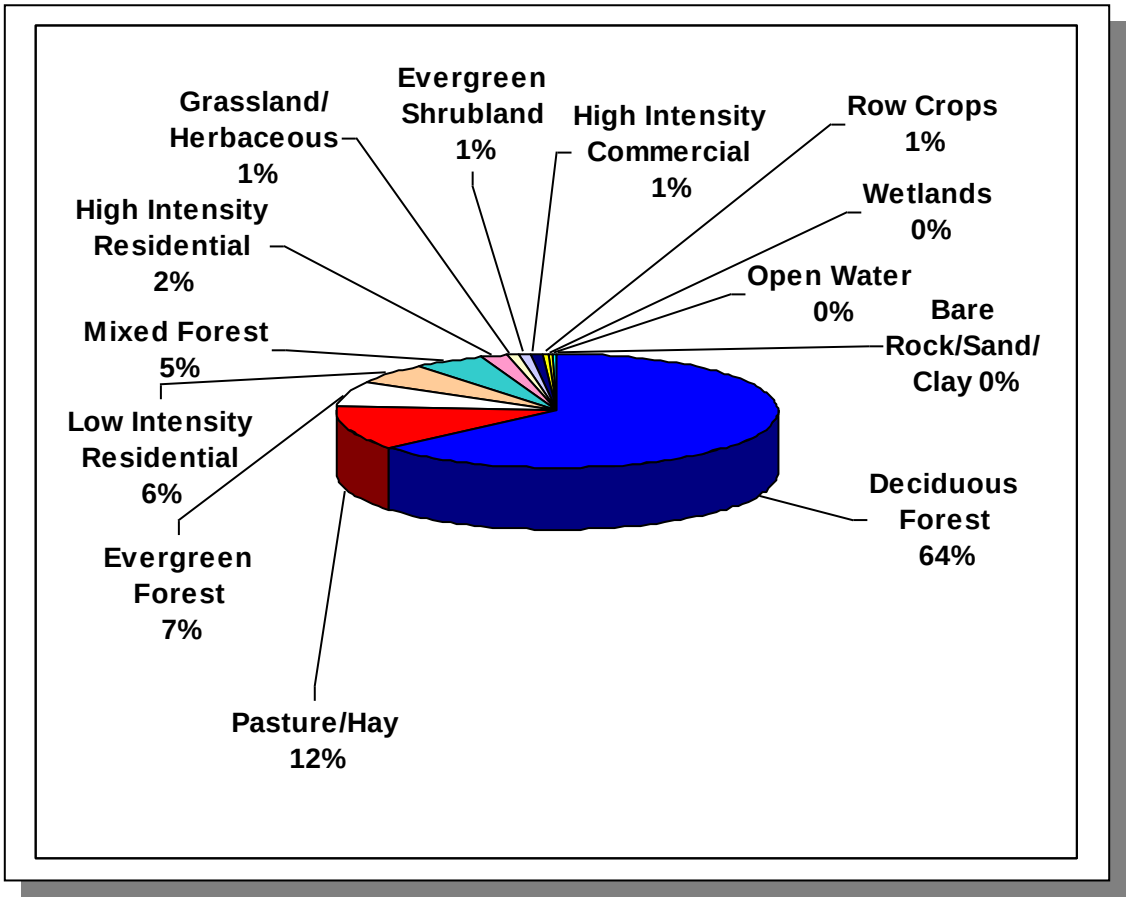

Figure 2-7. Land Use Distribution in the Tennessee Portion of the Pigeon River Watershed.
More information is provided in Appendix II.

Sinkholes, springs, disappearing streams and caves characterize karst topography. The term “karst” describes a distinctive landform that indicates dissolution of underlying soluble rocks by surface water or ground water. Although commonly associated with limestone and dolomite (carbonate rocks), other highly soluble rocks such as gypsum and rock salt can be sculpted into karst terrain. In karst areas, the ground water flows through solution-enlarged channels, bedding planes and microfractures within the rock. The characteristic landforms of karst regions are: closed depressions of various size and arrangement; disrupted surface drainage; and caves and underground drainage systems. The term “karst” is named after a famous region in the former country of Yugoslavia.

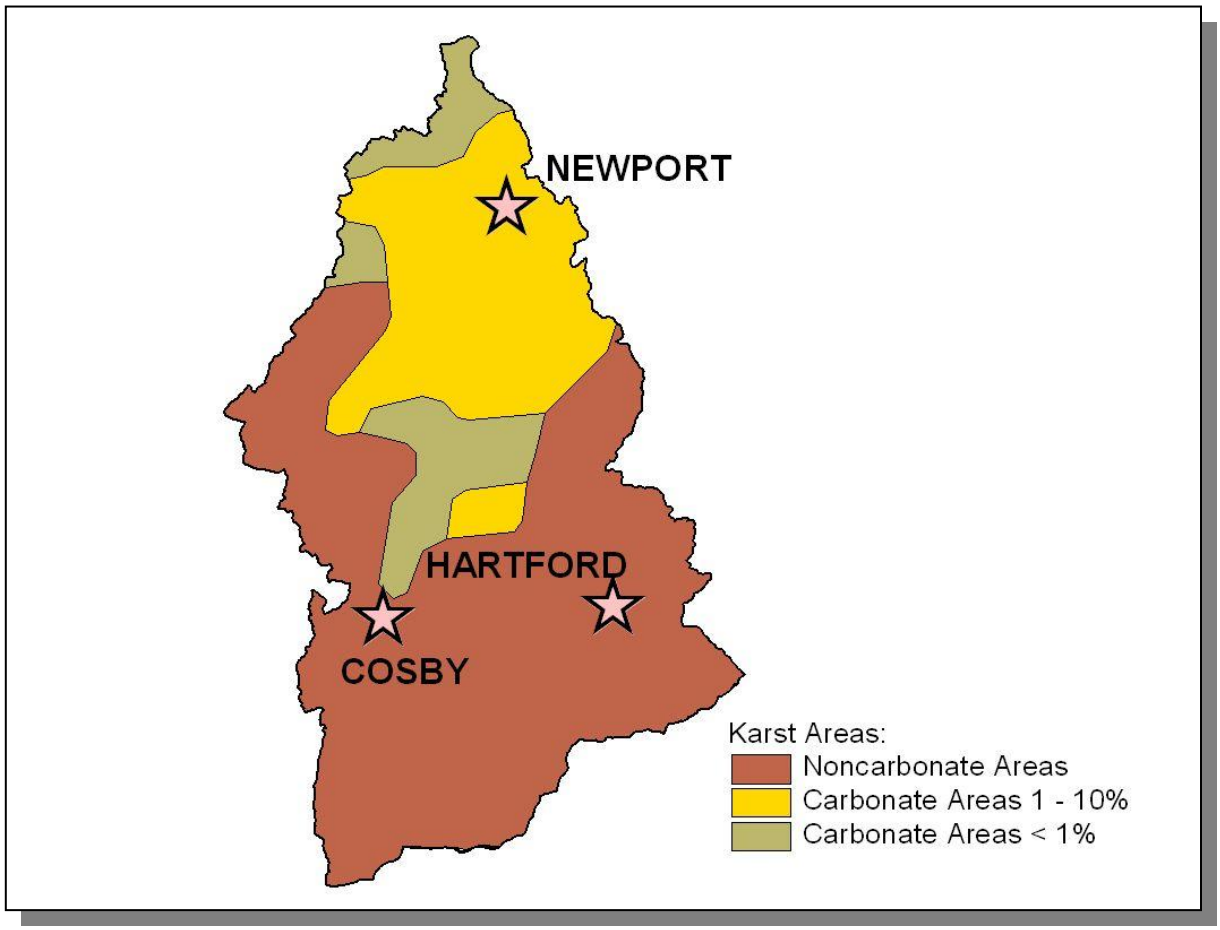

Figure 2-8. Illustration of Karst Areas in the Tennessee Portion of the Pigeon River Watershed. *Locations of communities in the watershed are shown for reference.*

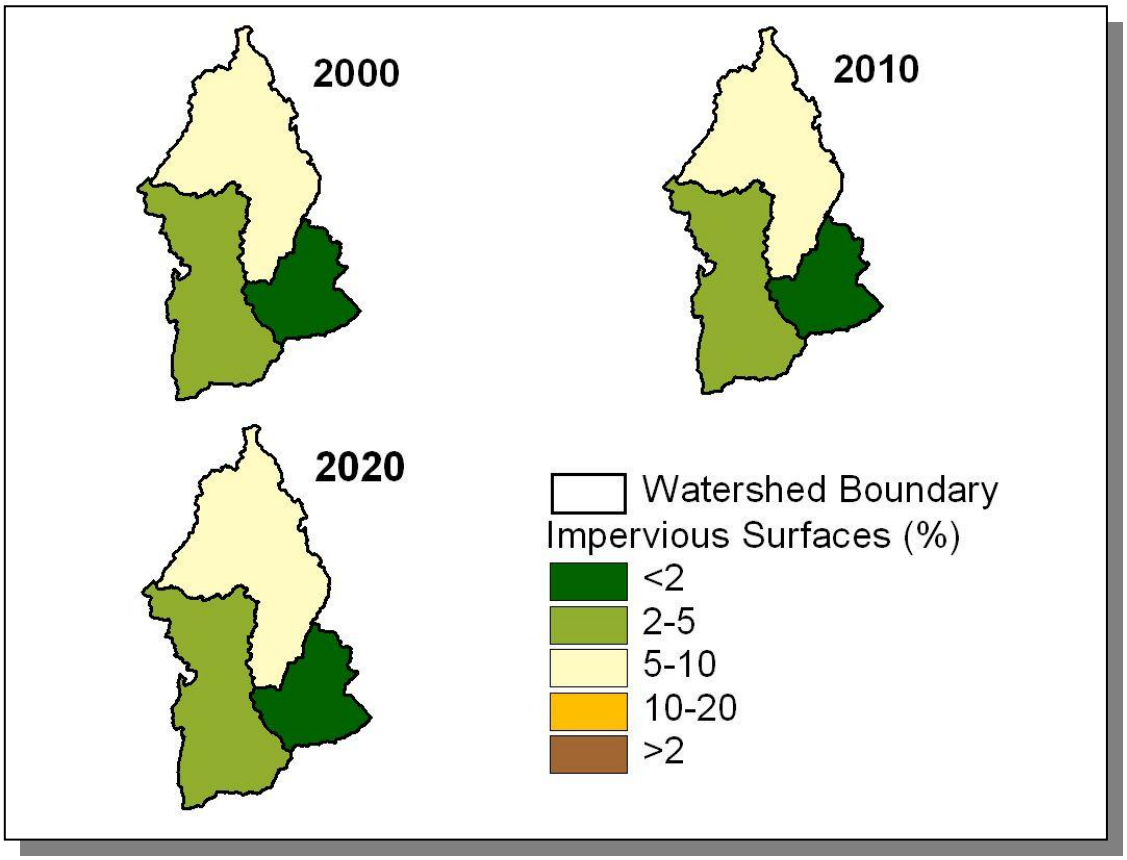

Figure 2-9. Illustration of Total Impervious Area in the Tennessee Portion of the Pigeon River Watershed. *All HUC-12 subwatersheds are shown. Current estimates and projected total impervious cover calculated by HUC-12 are provided by EPA Region 4. More information can be found at: http://www.epa.gov/ATHENS/research/impervious/.*

2.5. ECOREGIONS AND REFERENCE STREAMS. Ecoregions are relatively homogeneous areas of similar geography, topography, climate and soils that support similar plant and animal life. Ecoregions serve as a spatial framework for the assessment, management, and monitoring of ecosystems and ecosystem components. Ecoregion studies can aid the selection of regional stream reference sites, identifying high quality waters, and developing ecoregion-specific chemical and biological water quality criteria.

There are eight Level III Ecoregions and twenty-five Level IV subecoregions in Tennessee. The Pigeon River Watershed lies within 2 Level III ecoregions (Blue Ridge Mountains and Ridge and Valley) and contains 4 Level IV subecoregions:

- **Southern Sedimentary Ridges (66e)** include some of the westernmost foothill areas of the Blue Ridge Mountains ecoregion, such as the Bean, Starr, Chilhowee, English, Stone, Bald, and Iron Mountain areas. Slopes are steep, and elevations are generally 1000-4500 feet. The rocks are primarily Cambrian-age sedimentary (shale, sandstone, siltstone, quartzite, conglomerate), although some lower stream reaches occur on limestone. Soils are predominantly friable loams and fine sandy loams with variable amounts of sandstone rock fragments, and support mostly mixed oak and oak-pine forests.

- **Southern Metasedimentary Mountains (66g)** are steep, dissected, biologically-diverse mountains that include Clingmans Dome (6643 feet), the highest point in Tennessee. The Precambrian-age metamorphic and sedimentary geologic materials are generally older and more metamorphosed than the Southern Sedimentary Ridges (66e) to the west and north. The Appalachian oak forests and, at higher elevation, the northern hardwoods include a variety of oaks and pines, as well as silverbell, hemlock, yellow poplar, basswood, buckeye, yellow birch, and beech. The native spruce-fir forest, found generally above 5500 feet, has been affected greatly over the past twenty-five years by the great woolly aphid. The Copper Basin, in the southeast corner of Tennessee, was the site of copper mining and smelting from the 1850's to 1987, and once left more than fifty square miles of eroded bare earth.

- **Southern Limestone/Dolomite Valleys and Low Rolling Hills (67f)** form a heterogeneous region composed predominantly of limestone and cherty dolomite. Landforms are mostly low rolling ridges and valleys, and the soils vary in their productivity. Landcover includes intensive agriculture, urban and industrial, or areas of thick forest. White oak forests, bottomland oak forest, and sycamore-ash-elm riparian forest are the common forest types, and grassland barrens intermixed with cedar-pine glades also occur here.

- **Southern Shale Valleys (67g)** consist of lowlands, rolling valleys, and slopes and hilly areas that are dominated by shale materials. The northern areas are associated with Ordovician-age calcareous shale, and the well-drained soils are often slightly acid to neutral. In the south, the shale valleys are associated with Cambrian-age shales that contain some narrow bands of limestone, but the soils tend to be strongly acid. Small farms and rural

residences subdivide the land. The steeper slopes are used for pasture or have reverted to brush and forested land, while small fields of hay, corn, tobacco, and garden crops are grown on the foot slopes and bottom land.

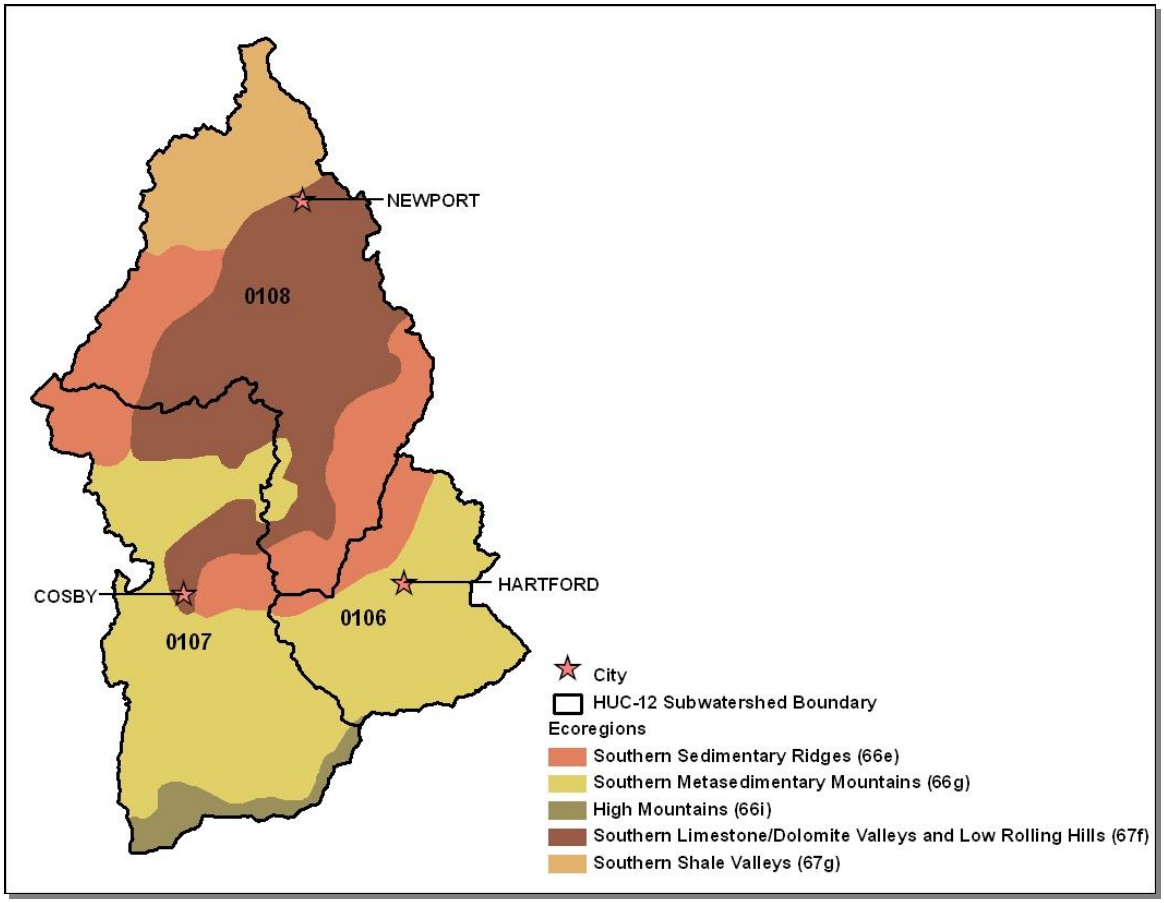

Figure 2-10. Level IV Ecoregions in the Tennessee Portion of the Pigeon River Watershed. *HUC-12 subwatershed boundaries and locations of Cosby, Hartford, and Newport are shown for reference.*

Each Level IV Ecoregion has at least one reference stream associated with it. A reference stream represents a least impacted condition within that ecoregion and may not be representative of a pristine condition.

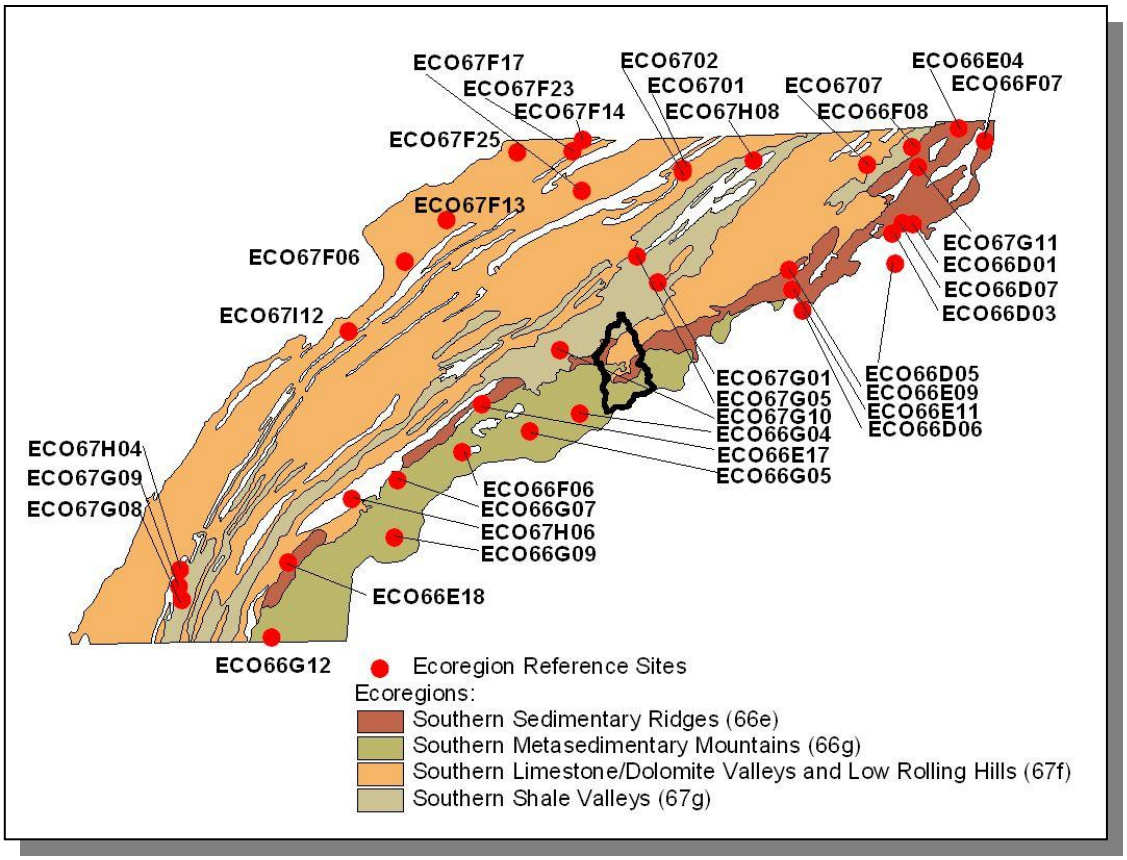

Figure 2-11. Ecoregion Monitoring Sites in Level IV Ecoregions 66e, 66g, 67f, and 67g. *The Tennessee Portion of the Pigeon River Watershed is shown for reference. More information, including which ecoregion reference sites were inactive or dropped prior to 06/01/2006, is provided in Appendix II.*

2.6. NATURAL RESOURCES.

2.6.A. Rare Plants and Animals. The Heritage Program in the TDEC Division of Natural Areas maintains a database of rare species that is shared by partners at The Nature Conservancy, Tennessee Wildlife Resources Agency, the US Fish and Wildlife Service, and the Tennessee Valley Authority. The information is used to: 1) track the occurrence of rare species in order to accomplish the goals of site conservation planning and protection of biological diversity, 2) identify the need for, and status of, recovery plans, and 3) conduct environmental reviews in compliance with the federal Endangered Species Act.

GROUPING	NUMBER OF RARE SPECIES
Fish	2
Mammals	6
Plants	10
Total	**18**

Table 2-3. There are 18 Known Rare Plant and Animal Species in the Tennessee Portion of the Pigeon River Watershed.

In the Tennessee portion of the Pigeon River Watershed, there are two known rare fish species.

SCIENTIFIC NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS
Etheostoma blennioides gutselli	Tuckasegee Darter		E
Phoxinus tennesseensis	Tennessee Dace		D

Table 2-4. Rare Aquatic Species in the Tennessee Portion of the Pigeon River Watershed. *State Status: E, Listed Endangered by the Tennessee Wildlife Resources Agency; D, Deemed in Need of Management by the Tennessee Wildlife Resources Agency. More information may be found at http://www.state.tn.us/environment/na/.*

2.6.B. Wetlands. The Division of Natural Areas maintains a database of wetland records in Tennessee. These records are a compilation of field data from wetland sites inventoried by various state and federal agencies. Maintaining this database is part of Tennessee's Wetland Strategy, which is described at:

http://www.state.tn.us/environment/na/wetlands/

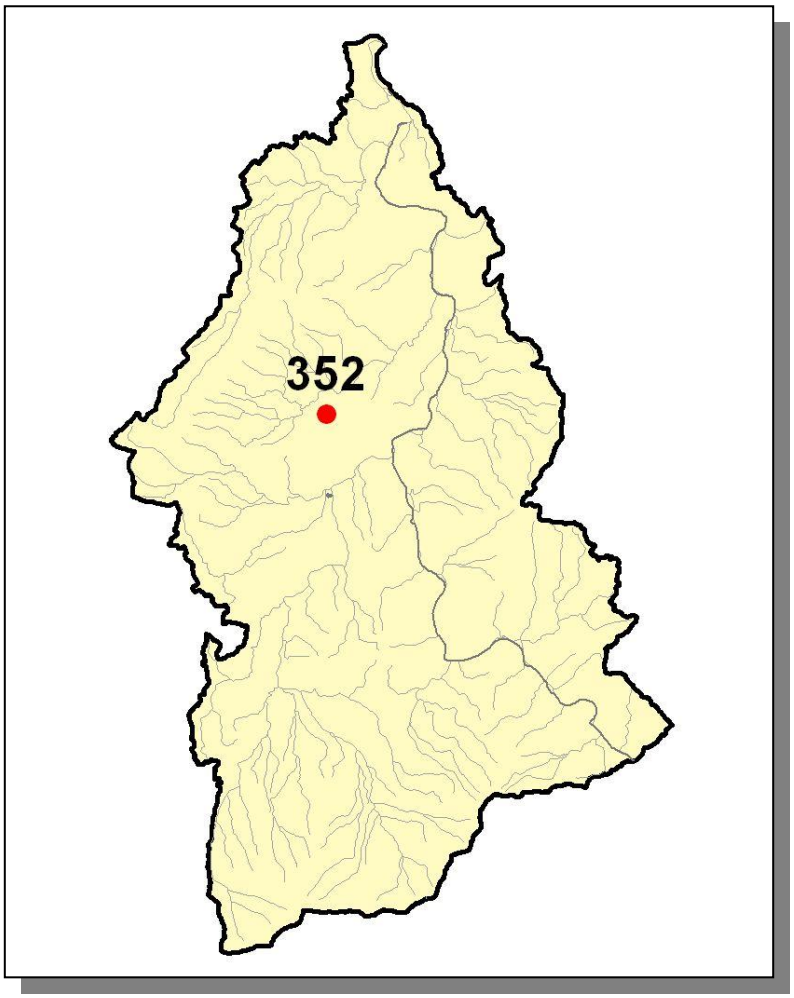

Figure 2-12. Location of Wetland Sites in TDEC Division of Natural Areas Database in the Tennessee Portion of the Pigeon River Watershed. ***This map represents an incomplete inventory and should not be considered a dependable indicator of the presence of wetlands.*** *There may be additional wetland sites in the watershed. More information, including identification of wetland sites labeled, is provided in Appendix II.*

2.7. CULTURAL RESOURCES.

2.7.A. Public Lands. Some sites representative of the cultural heritage in the Tennessee portion of the Pigeon River Watershed are under state or federal protection:

- Cherokee National Forest is a 664,000-acre forest managed by the U.S. Department of Agriculture, Forest Service. More information may be found at: http://www.fs.fed.us/r8/cherokee/

- The Great Smoky Mountains National Park consists of 521,621 acres of land managed by the National Park Service. More information may be found at: http://www.nps.gov/grsm/

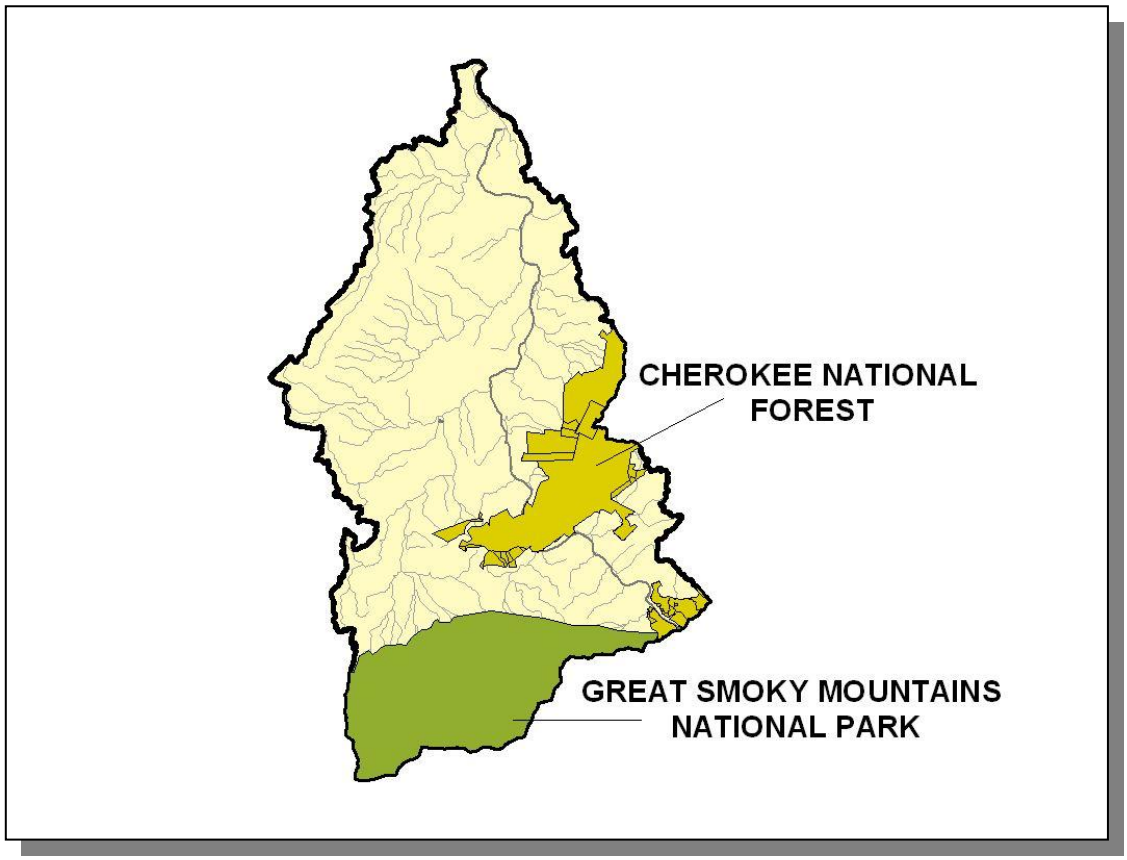

Figure 2-13. Public Lands in the Tennessee Portion of the Pigeon River Watershed. *Data are from Tennessee Wildlife Resources Agency.*

2.8. TENNESSEE RIVERS ASSESSMENT PROJECT. The Tennessee Rivers Assessment is part of a national program operating under the guidance of the National Park Service's Rivers and Trails Conservation Assistance Program. The Assessment is an inventory of river resources, and should not be confused with "Assessment" as defined by the Environmental Protection Agency. A more complete description can be found in the Tennessee Rivers Assessment Summary Report, which is available from the Department of Environment and Conservation and on the web at:

http://www.state.tn.us/environment/wpc/publications/riv/

STREAM	NSQ	RB	RF	STREAM	NSQ	RB	RF
Carson Creek	3			Indian Camp Creek	3		
Cosby Creek	1,3	2	1	Pigeon River	2	2	3
English Creek	4						

Table 2-5. Tennessee Rivers Assessment Project Stream Scoring in the Pigeon River Watershed.

Categories: NSQ, Natural and Scenic Qualities
RB, Recreational Boating
RF, Recreational Fishing

Scores: 1. Statewide or greater Significance; Excellent Fishery
2. Regional Significance; Good Fishery
3. Local Significance; Fair Fishery
4. Not a significant Resource; Not Assessed